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AW

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/645,903	08/25/2000	Li Li	3361.2US (97-663.2)	6825
24247	7590	10/15/2003	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			GUERRERO, MARIA F	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 10/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/645,903

Applicant(s)

LI, LI

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8 and 9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>21</u> . | 6) <input type="checkbox"/> Other: |

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DETAILED ACTION

1. This Office Action is in response to the Amendment filed September 15, 2003.

Claim 7 is canceled.

Claims 1-6 and 8-9 are pending.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on September 15, 2003 has been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 2 and 9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original disclosure does not provide support for the limitation "said metal-containing conductive pad substantially free from **charging** damage". The original disclosure provides support for the limitation "a substantially damage-free conductive metal-containing conductive pad". However, there is no disclosure specifying the damage as charging damage.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (U.S. 5,883,001) in view of Wilson et al. (U.S. 4,943,359).

Jin et al. teaches a contact opening in a dielectric layer extending from an upper surface of the dielectric layer to a substantially damage free metal-containing conductive pad having substantially parallel sidewalls (Fig. 8, col. 7, lines 29-31, 45-49). Jin et al. teaches a contact opening in a dielectric layer and a barrier layer, the semiconductor substrate having a substantially damage free metal-containing conductive pad under the dielectric layer and the barrier layer. Jin et al. also shows the residues being removed from the contact opening (residues free) (Fig. 8, col. 2, lines 55-60, col. 7, lines 45-49). In addition, Jin et al. teaches employing a fluorine-containing compound (col. 7, lines 49-50).

Regarding the limitations "the metal-containing conductive pad substantially free of charging damage"; Jin et al. teaches that no oxide residue remains on the pads. Jin et al. also teaches limiting the dry etch time to avoid the charging damage (Fig. 8, col. 2, lines 55-65, col. 7, lines 45-62, col. 8, lines 25-30, col. 10, lines 5-12). Therefore, the metal-containing conductive pad taught by Jin et al. is substantially free of charging damage.

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Regarding the limitations “a metal polymer residue-free and oxide polymer residue free contact”; Jin et al. teaches the contact opening being residues free (Fig. 8, col. 2, lines 55-60, col. 7, lines 45-49). Therefore, there is not metal polymer residue or oxide polymer residue in the contact opening.

Jin et al. does not specifically show removing the residues by applying nitric acid and phosphoric acid. However, Wilson et al. shows that the use of nitric acid and phosphoric acid for the removing of residues is well known in the art (col. 4, lines 35-38).

Furthermore, product-by-process claims are limited and defined by the process; determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. In re Hirao and Sato et al., 190 USPQ 15 at 17 (CCPA 1976 (footnote 3). See also IN re Brown and Saffer, 173 USPQ 685 (CCPA 1972); In re Luck and Gainer, 177 USPQ 523 (CCPA 1973); In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to recognize that the structure taught by Jin et al. would correspond with the structure claimed.

Response to Arguments

5. Applicant's arguments with respect to claims 2 and 9 have been considered but are moot in view of the new ground(s) of rejection.

6. Applicant's arguments filed September 15, 2003 have been fully considered but they are not persuasive. Claims 1-6 and 8-9 stand rejected.

Applicant argued that the combination of Jin et al. and Wilson et al. fails to teach an opening in a dielectric layer having substantially parallel sidewalls. However, Jin et al. shows a contact opening in a dielectric layer extending from an upper surface of the dielectric layer to a substantially damage free metal-containing conductive pad having substantially parallel sidewalls (Fig. 8, col. 7, lines 29-31, 45-62, col. 8, lines 25-30, col. 10, lines 5-12).

Applicant argued that the combination of Jin et al. and Wilson et al. fails to teach all claim limitations. However, the patentability of a product does not depend on its method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. In re Hirao and Sato et al., 190 USPQ 15 at 17 (CCPA 1976 (footnote 3)). See also In re Brown and Saffer, 173 USPQ 685 (CCPA 1972); In re Luck and Gainer, 177 USPQ 523 (CCPA 1973); In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Applicant argued that Jin fails to teach or suggest the substantially damage free metal containing conductive pad because Jin acknowledges the main etch and overetch

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may induce charging damage. However, Jin et al. also teaches limiting the dry etch time to avoid the charging damage and producing excellent reliability (Fig. 8, col. 2, lines 55-65, col. 7, lines 45-62, col. 8, lines 25-30, col. 10, lines 5-12). Therefore, the metal-containing conductive pad taught by Jin et al. is substantially free of charging damage.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., **metal-containing** barrier layer) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Furthermore, a person of ordinary skill in the art at would recognize that the structure taught by Jin et al. would correspond with the structure claimed because there is not evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within


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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 703-305-0162.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


Maria Guerrero
Patent Examiner
October 10, 2003